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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/065,688 | 11/08/2002 | Russell P. Schuchmann | ETC7455.050 | 2325 |
| 27060 | 7590 | 01/26/2005 | EXAMINER | |
| ZIOLKOWSKI PATENT SOLUTIONS GROUP, LLC (EATON) | | | MILLER, PATRICK L | |
| 14135 NORTH CEDARBURG ROAD | | | ART UNIT | |
| MEQUON, WI 53097 | | | PAPER NUMBER | |
| | | | 2837 | |

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/065,688

Applicant(s)

SCHUCHMANN, RUSSELL P.

Examiner

Patrick Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-13 and 15-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 1,2,4-7,19,20 is/are allowed.
6) ☒ Claim(s) 8-13 is/are rejected.
7) ☒ Claim(s) 15-18 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 08 November 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 15-17 are objected to because of the following informalities: see bullet(s) below.

Appropriate correction is required.

- Claim 17 recites, “the undesirable mechanical condition” (l. 13). Lack of antecedent basis. Change “the” to “an.”
- Claim 15 recites, “an undesirable mechanical condition” (l. 2). This claim now depends from Claim 17, which already states the aforementioned limitation. Therefore, Change “an” to “the.”

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higgins et al (3,839,629) in view of Kliman (6,199,023).
 - Higgins et al disclose a medium to detect and signal mechanical anomalies in a motor-driven system, where the medium determines an instantaneous motor power signal from voltage and current data collected by one or more voltage and current sensors (Fig. 1, #22 calculates power from #18 and #26); processing the instantaneous motor power signal (Fig. 1, #28 and Registers process the power signal); comparing the processed instantaneous power signal to a power signal modeled during healthy operation of the

motor (cols. 5/6, lines 38-68/1-30); and if the processed instantaneous motor power signal exceeds a threshold, providing an external notification signaling anomalies in the motor-driven system (col. 6, lines 7-30). Also note that when the power signal has changed when compared to the base-line power signal, but the threshold has not been exceeded, this means that the system does differentiate between noise, which makes the power signal different from the base-line power, and mechanical anomalies, where the power signal is above the threshold (inferred from cols. ¾, ll. 32-68/1-30).

- Higgins et al do not disclose the control system being controlled by a computer that uses a computer program stored on a computer readable storage medium.
- Kliman disclose a control system to detect and signal mechanical anomalies in a motor-driven system, wherein the control system is implemented using a computer that uses a program (Fig. 5, #37). Furthermore, the computer program instructs the computer to measure current and voltage and transform the measured voltage from the time domain to the frequency domain using a Fast Fourier Transform (FFT) (col. 4, lines 51-62). Using a computer program to control a motor system provides the advantage of decreasing system computation time, especially when performing FFT's, since a computer may be configured with enough memory to efficiently handle FFT calculations.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the control system of Higgins et al could be implemented using a computer that is controlled by a program. This provides the advantage of decreasing system computation time, as taught by Kliman.

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- With respect to claim 9, Higgins et al disclose performing a spectral analysis on the motor power signal (col. 5, lines 48-62).
- With respect to claim 10, Higgins et al do not explicitly disclose applying a FFT to transform the power signal from time domain to frequency domain. However, the Examiner takes Official Notice that it would have been obvious to one having ordinary skill in the art at the time of the invention that a FFT could be used to transform the power signal of Higgins et al from the time domain to the frequency domain. The motivation to apply a FFT to transform the power signal is to provide the advantage of reducing the number of computations, which decreases computation time, when compared to regular Fourier transformation algorithms.
- With respect to claim 11, the system of Higgins et al controls the computer/processor to input the instantaneous motor power signal to a band-pass filter (col. 5, lines 62-68; Fig. 5, #'s 72 and 74).
- With respect to claim 12, Higgins et al disclose the instantaneous motor power signal includes a three-phase power signal (col. 3, lines 49-51).
- With respect to claim 13, the system of Higgins et al displays the spectrum analysis of the power signal on a console (Fig. 1, output to #42).

Allowable Subject Matter

3. Claims 1-7 and 15-20 are allowed. NOTE: for claims 15-17, the minor informalities must be corrected before these claims are allowable.
4. The following is an examiner's statement of reasons for allowance:

- With respect to claim 1, the Prior Art discloses motor control systems that determine a power signal from a voltage and current signal; generate a real-time spectrum analysis of the power signal; and determine undesirable torque conditions based on the spectral analysis. The Prior Art also discloses systems that measure voltage and current to get a power signal, and interrupt power to a device when the power signal is outside a predetermined range. However, the primary reason for allowance is because the Prior Art does not disclose automatically disabling a pump when an undesirable torque condition exceeds a threshold, where the undesirable torque condition is determined based on frequency domain analysis of a power signal.
- With respect to claim 17, the Prior Art discloses determining undesirable harmonics in a real-time power signal based on a comparison with a baseline power signal and distinguishing between spectral magnitudes at various frequencies, but does not disclose delineating between a transient condition in the pump and an undesirable mechanical condition based on several cycles of undesirable harmonics in the real-time power signal.
- With respect to claim 19, the Prior Art discloses motor control systems that determine a power signal from a voltage and current signal; generate a real-time spectrum analysis of the power signal; and determine undesirable torque conditions based on the spectral analysis. The Prior Art also discloses systems that measure voltage and current to get a power signal, and interrupt power to a device when the power signal is outside a predetermined range. However, the primary reason for allowance is because the Prior Art does not disclose interrupting pump operation in response to an indication of a

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mechanical disturbance, where the result of the comparison of the spectrum analysis indicates mechanical disturbances.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

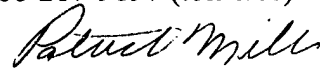
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick Miller whose telephone number is 571-272-2070. The examiner can normally be reached on M-F, 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on 571-272-2800 ext 41. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

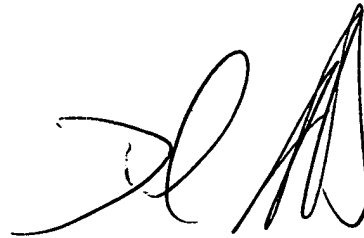
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Patrick Miller
Examiner
Art Unit 2837

pm
January 20, 2005



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SUPERVISORY PATENT EXAMINER
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